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For knowledge management to be successful, organizational learning and a research culture must support it. This chapter presents various models of organizational learning as they influence the design and implementation of knowledge-based systems. The theoretical considerations presented are exemplified by a discussion of the impact of accountability movements on higher education, in general, and institutional research, in particular, and on the creation and implementation of knowledge-based systems in colleges and universities.

Organizational Learning and the Case for Knowledge-Based Systems

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Using technology to provide information to decision makers has proven to be a more difficult task in the education sector, partly as a result of a lack of financial resources available for technology infrastructure and support and partly because higher education institutions have not traditionally been under the same pressure as business institutions to become self-sustaining and profitable. However, as the current accountability movement has spread across the country, there has been a growing need for reliable internal and external information (Wells, Silk, and Torres, 1999).

Many institutions have a desire for research that informs their decision making, but the lack of technical infrastructure has seemingly thwarted their efforts. In addition, numerous studies have shown that technology tools alone do not address issues of organizational cultures and structures (Telem, 1996; Sirotnik and Burstein, 1987). Instead, the adaptation of technology must be embedded within organizational processes in an iterative process of trial and experimentation (Levine, 2001). However, it is much easier to persuade organizations to acquire new technology tools than to modify or redesign existing processes within the organization (Coate, 1996). Many failed information system implementations in higher education have been attributed to an unmet need on the part of the organization to address issues of information sharing and knowledge creation from multiple viewpoints (Leonard and Straus, 1997; Levine, 2001). Others have spoken to the information politics within an organization as likely causes of information system failure (Davenport, 1997; Friedman and Hoffman, 2001; Petrides, Khanuja-Dhall, and Reguerin, 2000).

As noted in the opening chapter, businesses have become increasingly concerned with mobilizing what they believe is their greatest asset, knowledge: the combination of information, experience, circumstances, and

understanding that can be applied to any decisions or situations (Cliffe, 1998; Hansen, Nohria, and Tierney, 1999; Zisman, 1999; Davenport, 1997). Managing knowledge networks within organizations has now become a critical challenge taken up by the business community (Zisman, 1999). Business and some education organizations are increasingly moving toward models of organizational learning that are based on knowledge-driven decision making.

Various authors suggest that organizational transformation will occur only if the process itself is knowledge-driven and if members of the educational learning community develop and implement knowledge-based systems (COIL, 1999; Bloodgood and Salisbury, 2001). So whereas in the early 1990s knowledge management practices focused primarily on the management of existing data-based resources within an organization, today the focus on knowledge management has been to help identify additional information needs throughout the organization and then to use innovative information technology tools to create, capture, and use that information to meet organizational goals (Duffy, 2000). Knowledge management today is described as a process in which knowledge is created as a result of the multidimensional categorization of information in several different contexts by multiple users (Duffy, 2000; Levine, 2001). However, the implementation of knowledge management practices varies a great deal across organizations.

Knowledge Management from an Organizational Learning Perspective

The evolution from data to information and from information to knowledge has played a leading role in shaping how organizations develop strategies and plans for the future. Several authors believe that successful organizations that forge ahead in a rapidly changing business environment will do so through the creating and sharing of new knowledge (Argyris and Schon, 1996; Senge, 1997; Brown, 1999; Senge, 1990). The use of cross-functional teams, customer or product-focused business units and work groups, and communities of practice are just a few of the emerging trends that allow organizations to make the best use of their most valuable asset, their staff (Sveiby, 1997; Brown, 1999). Thus, organizational learning from a knowledge management perspective provides the opportunity for the goals and objectives of the organization to be cultivated simultaneously with the goals and objectives of the individual (COIL, 1999). Specifically, this means that people are important to the learning process within the organization but organizational learning cannot be reduced to individual learning (Levine, 2001).

Within an organizational learning context, an ecological approach to knowledge management has been explored by Thomas Davenport's work on information ecology, which calls for communities of practice to be involved in the establishment of an ecological model that is holistically managed within an organization. The human-centered information management model described by Davenport focuses on the information environment, the

organizational environment that surrounds it, and the external environment of the marketplace. In this model, primary importance is placed on the people within the organization, in terms of their strategic use of information, information politics, and the culture and behavior of individuals within an organization (Davenport, 1997).

An ecological approach to knowledge management is based on the assumption that the accumulation of data is influenced by the core values of the college or university (or a group or team or department within the institution), and that through some process of human interaction and context, including the use of computers to access and review the data, these data then take on significance and importance as information. Next, through the process of context, accumulation of data, sense making, synthesis, and reflection, this information is transformed and converted to knowledge that is relevant to decision making within the organization, which then may or may not produce an action step but does influence the next round of data accumulation (Brown, Collins, and Duguid, 1989; COIL, 1999; Johnson, 1996). For example, it might be that the use of information may change the organization in terms of producing more effective decision making, or that a transformation occurs within the organizational structure in the process of using the information itself.

Another ecological model, the knowledge ecology model, has at its core an active, interdependent, and complex adaptive system that adds an innately systemic dimension to the knowledge and learning that occurs within the community (COIL, 1999; Brown, 2000; Sveiby, 1997). Within a knowledge ecology perspective is the accrued expertise and learning within the ecosystem, where ideas are exchanged, innovation blossoms, and value is added to information, thus producing new knowledge to test and apply in the internal and external environment, predominantly through the use of information systems (COIL, 1999).

What Are Knowledge-Based Systems?

Approaches to knowledge management, which vary across the data-information-knowledge continuum, affect the design and implementation of knowledge-based systems. At one end of the continuum is the building of data-based information systems that seek to capture the knowledge of those within the organization and make it available to the organization as a whole (Brown, 2000; Mitchell, 2000). This includes decision support systems that allow users to extract useful information in large datasets in order to run analyses that support decision-making efforts within the organization. It also includes the use of data mining, which has been addressed in Chapter Two. The primary focus in using knowledge management for data-based information systems is to systematically manage, leverage, and store knowledge within an organization (Laudon and Laudon, 2001). This can include the creation and sharing of both internal and external knowledge. Most data-based information systems contain quantitative elements that lack the

value-added tacit qualities of information (Davenport, 1997). At the other end of the spectrum is an approach to knowledge management that includes building and managing systems that are knowledge-based. These systems are designed through an ongoing course of action that examines the work processes and technical systems as well as changes in social and behavioral aspects of work, such as culture, group dynamics, and collaboration (Davenport, DeLong, and Beers, 1998; Levine, 2001). Bernbom (1999) suggests that institutional researchers assess their information management practices as a way to understand both the formal and informal information environment of the institution, thereby helping facilitate interconnections among different data sources within their institutions. In this way, the institutional researcher becomes a knowledge industry analyst who is involved in all levels of institutional information and services (Peterson, 1999).

Knowledge-based systems are in fact an outgrowth of an ecological model of knowledge management, which deliberately uses a sociotechnical approach to managing information systems that combine organizational processes with the use of innovative technology in knowledge management practices (Telem, 1996; Levine, 2001). This approach has also been referred to as technology change management, in which organizational changes that are necessary to implement and maintain successful knowledge management systems are made explicit through the advent of organizational learning (Levine, 2001). Equally as important is the sharing of internal tacit knowledge, which was defined in Chapter One.

The purpose of having knowledge-based systems is to be able to make more informed, research-driven policies and procedures that improve program and service delivery to students as well as to faculty, staff, and administration within the organization. The ongoing and iterative process of design, implementation, and feedback that takes place within these knowledge-based systems is the hallmark knowledge management from an organizational learning perspective. Essentially, associations of people create knowledge systems that are supported and elevated by technology networks, where all members of the organization have expertise not only in managing information and knowledge-based systems, but also in assessing and taking action to promote organizational change in terms of educational management, attitudes, organizational behavior, and policy. Thus, as higher education institutions implement and maintain knowledge-based systems, they are likely to see structural, political, human, and symbolic modifications within the organization.

Creation of Knowledge-Based Systems

As mentioned earlier, the creation of knowledge-based systems is an ongoing iterative process that involves not only the planners and designers of these systems but also end-users of information throughout the organization. The underlying motivation for creating knowledge-based systems is to understand how organizations can become better at what they do by using

internal and external information systems to support a cycle of continuous learning (Argyris, 1991; COIL, 1999; Garvin, 1993). At the core of the continuous learning system is an ecological approach to knowledge management. This ecological approach is not based on solving a particular problem per se. The purpose is to support a culture of research and inquiry that informs continuous improvement of an organization's mission and goals on an ongoing basis. This allows the needs of research to determine the direction of the development of information systems, as opposed to the more common approach that lets the information system dictate the needs of research based on a centrally prescribed set of outputs. Hence, a knowledge-based system does more than just support decision making; it is also about a process that enables an organization to decide on an ongoing basis what the problems are. This is also referred to as double-loop learning, which asks not just questions about what the problems are, but the reasons and motives behind those questions (Friedman and Hoffman, 2001; Morgan, 1986; Levine, 2001).

Four key elements have been identified as central to the process of creating knowledge-based systems: (1) the identification of information strategies, (2) an ongoing awareness of the organizational context, (3) an examination of information politics within the organization, and (4) an assessment of the external environment and its influence on information needs. I discuss each one in more detail in what follows, and give examples for each of the four elements to illustrate their relatedness to the creation of knowledge-based systems in higher education, with implications for institutional research and planning.

Information Strategies. Articulated mission and goals enable organizations to develop strategic planning. It is equally important to clearly tie organizational information needs to those missions and goals and to identify the type of information that is needed to support decision-making and policies that are in line with the goal and mission of the organization (Drucker, 1988). This can be based on well-defined problems, as well as through pattern-seeking strategies such as data mining. For example, if student success is the mission, and increasing the number of minority students who major in math and science is a goal, then the information needs would focus on demographic, enrollment, and program data. Alternatively, if the goal is to have graduate students finish their education in five years or less, then an alternative information strategy might be to collect and analyze data on graduate student attrition, departmental support, and financial aid. If a college is trying to make informed decisions about student services that will positively impact student success, then information on those programs and services is needed instead.

There may be multiple information needs throughout an organization, but linking them specifically to the overall mission and goals of the organization is essential to the successful design, implementation, and actual use of information systems (Drucker, 1988; Laudon and Laudon, 2001). For example, data-gathering processes might require individual requests to be

made, data to be extracted, and individual analyses to be conducted, often by people who are uncertain of the information and its intended purpose. In addition, whether or not information needs and strategies are openly discussed in the organization is also important (Walleri and Stoering, 1996). Information strategies in higher education include both the administrative aspects of higher education and instruction. Identifying information needs includes naming the problems that information can resolve, determining what and how much additional information might be required to solve a problem, and then planning for the collection of additional data (Sirotnik and Burstein, 1987).

Organizational Context. Information behavior and culture make up the organizational context for knowledge-based systems (Davenport, 1997; Petrides, Khanuja-Dhall, and Reguerin, 2000). Knowledge-based systems are likely to be more successful if the culture communicates the value and importance of information and knowledge. Organizational learning is likely to take place when work is done within the context of the organization's processes, structure, culture, and human resource issues, which include philosophy and goals, leadership, and cultural assumptions (Schein, 1992). Organizational behavior and culture are embodied by the structures, functions, and norms that support the data-information-knowledge-action cycle (McDermott, 1999). This includes looking at the planning and design process in terms of who is involved, as well as at the technical architecture within the organization, which is important to the flow of knowledge and information within an organization (Davenport, 1997). Ultimately, the acquisition of information by administrators and staff on issues such as resource allocation, scheduling, budgeting, administration, and services creates a feedback loop into the system because of the impact that the information has had on the goals of the organization.

In the case of student success, there could be multiple methods used to acquire student information through various organizational structures, such as making a request to an institutional research office, creating personal databases, or asking colleagues or staff. The effectiveness of decisions based upon information attained via any of these methods can be compromised by a lack of reliability, validity, and congruence of the information. Due to the absence of standard terminology, inconsistent reporting formats and methods, spotty data collection methods, and incomplete records, the same question can result in hundreds of different factual answers, each accurate in its own way. Therefore, an assessment of the type of information that is currently available and the development of a road map that illustrates how information flows throughout the organization will help in understanding information behavior (Davenport, 1997).

Information Politics. There are several key concerns about issues of information politics in the creation of knowledge-based systems. The first is to identify who controls information within the organization and what are the historical reasons for the control within the organization (Davenport, Eccles, and Prusak, 1992). Many institutional research offices are the main

repositories of information in higher educational institutions, but those offices can be found under several different places within the organizational structure, such as in departments of planning, instruction, support services, or information technology. Another key question is to determine who provides and interprets the information. If the support services office is the main interpreter of information in terms of written reports and presentations, these interpretations could then be used or discarded by an office of academic instruction because of competition for resources.

Other issues concerning information politics include the sharing of information (Davenport, 1997; McDermott, 1999). As discussed in Chapter One, a key question is, Are people rewarded for sharing information, whether or not it negatively or positively reflects on a particular program? In many organizations, large amounts of information that could be used for decision making are ignored for this reason (Leonard and Straus, 1997). And finally, it is important to determine whether any type of information sabotage might be going on. This can often be very subtle, such as a database that is not regularly maintained, corrections that are not entered into the system when they are reported, or a duplicate paper version that is maintained in addition to the database information (Davenport, 1997).

External Environment. From an organizational perspective, the external environment is a key element in terms of the need to use external information for internal decision making, as well as for demands for internal information from the external environment. Environmental scanning (for example, demographics of college-age students), competitive analysis (for example, data on who else is competing for an institution's new admissions), and employment data of recent graduates are a few examples of the use of external information for internal decision making. However, there are also external demands for internal information. For example, the accountability movement alone is putting increased demands on public higher education institutions to produce data on student outcomes, such as data about student test scores, persistence, completion, and in the case of two-year colleges, transfer. While the growing concern of state legislatures is primarily with accountability mandates, higher education institutions themselves have a growing need for research that can inform decision making and allow them to assess the effectiveness of their programs independent of the accountability mandates from the state. These demands provide challenges as well as a unique opportunity for higher education institutions to create an environment for organizational learning supported by knowledge-based systems.

Organizational Learning: What Does Institutional Research Have to Do with It?

Similar to the business world, institutions of higher education are looking for ways to apply concepts of organizational learning to help meet their primary goals and objectives. There are several ways in which institutional research offices are well situated to bring organizational learning, facilitated

by knowledge management, into the fold of higher education institutions. First, institutional research offices are frequently at the front line of defense in response to accountability mandates, since they are most likely responsible for analysis, interpretation, and dissemination of student outcome data. Second, because institutional research offices have traditionally been the main repository or nucleus of information in colleges and universities, they are likely to encounter a majority of the internal structures and procedures related to the flow of information in the organization. Third, because institutional research has traditionally been the catalyst for internal research and analysis, institutional resource offices are keenly positioned to lend assistance to the creation and maintenance of research-driven decision making. This research-driven decision making is arguably at the core of creating a research culture or culture of inquiry in higher education organizations.

Response to Accountability Mandates

During the 1990s, there was an increase in governmental and public demands for higher education's accountability. In 1997, the state higher education executive officers found that thirty-seven of fifty states used accountability or performance reporting. Since 1995, state accountability objectives have shifted from enhanced learning to demonstrated worth (Nettles and Cole, 1997). In the past, institutions of higher education responded by either complying with minimal reporting standards or directly or indirectly resisting governmental interference in higher education (Ewell, 1994). However, policymakers and the public have become less tolerant of these responses. Concomitantly, there is a growing need for research that can inform decision making and allow the institution to assess the effectiveness of its programs for state mandates and also independently of the accountability mandates from state legislatures.

In the environment of increased demands, there is a shift in institutional research from primarily a reporting function to that of a service function. As a service function, institutional research is in a position to continuously study and assess the institution's programs and serve as a bridge among academic, administrative, and governmental cultures (Volkwein, 1999). However, if institutional research plans to serve in this new role, institutional research staff must have training that, in addition to research skills, includes contextual knowledge and people and facilitation skills (Volkwein, 1999). For example, one college reported that its institutional research staff recently implemented a new process of academic program review. Institutional research staff cooperatively designed and conducted the review with the academic senate. By fusing the academic faculty's interests with the administration's interest, the review was handled efficiently and satisfactorily for both faculty and administration (Petrides, 2001b).

The changing nature of institutional research brings with it unforeseen issues. For instance, mandatory accountability measures compete with other institutional priorities (such as internal reviews) or organizational practices (such as continuous learning models). Institutional research staff in some cases find themselves duplicating efforts by sending information to a central office that will be used to negotiate with state legislatures, but not being able to use the same information for internal needs due to such issues as differing variable definitions or a lack of resources for the institutional research staff (Petrides, 2001b). In addition, accountability potentially creates an environment for campuses that exposes their weaknesses or problem areas, often with fear of punitive measures (Volkwein, 1999).

In the case of one community college faced with outcome-based funding, a tutorial center was given substantial additional funding with the goal of helping contribute to the degree completion rate of its students. The center had previously gathered very little information on students who received their services, other than to find out (often informally) what subjects needed additional tutors. The college administration was very committed to access and equity issues and wanted to ensure that the additional allocation of resources for various programs would be well-spent and provide them a return on their investment in terms of meeting state-mandated outcomes (Petrides, 2001a).

As part of a self-evaluation required for this additional funding, the tutorial center proceeded to create a pre and post questionnaire that students would fill out at the beginning of the semester and again the week before final exams. They created a database that they would use to analyze the data for the semester but also continue to gather and enter data on an ongoing basis. The center had as one of their objectives to increase not only the number of students served, but also to serve those students who were at risk of failing their class, which was in line with the college's equity mission. At the end of the semester, the center discovered that the majority of their students were in fact obtaining A's and B's in their classes and came to the tutorial center regularly in order to maintain their passing grades. The center staff wrote up the self-evaluation and presented it the administration. They were then told that their funding would be curtailed due to the fact that they had not demonstrated that they were meeting the needs of the student population who were at risk of failing a class (the C or D students).

The center staff later went on to successfully lobby the administration to continue their funding based on the premise that they had just collected baseline data and would now be able to make programmatic changes based on their findings. While this was in a sense a productive lesson for the center, it illustrates how a college or university under the stress of meeting state-based mandates may in fact inhibit organizational learning from taking place.

Organizational Learning and Accountability

The combination of organizational learning and accountability mandates may appear at first to be strange bedfellows. However, this intersection can be beneficial to future accountability mandates as well as to the response of higher education institutions if they support a research culture or culture of inquiry, that is, an environment where organizational learning is part of the everyday fabric.

What exactly is a research culture? A research culture is one that purposefully reflects on its own practices by quantitatively and qualitatively studying them and then by creating and implementing alternative actions accordingly (Rallis and MacMullen, 2000). A research culture permeates all levels of the institution and is not reserved for upper level management; it thus transforms all involved players into essential decision makers. Administrators and faculty apply accountability language and processes to new forms of internal improvement and decision making in management as well as in teaching and learning. A research culture involves shifting from a reactive to proactive mode in responding to problems. Reflective inquiry is a model of continuous learning that is a common theme in a research culture. These reflective institutions comprise active professionals who take responsibility for their own work and its subsequent impact and take action in continuous improvement (Argyris, 1991). In a research culture environment, the improvement of teaching and learning is intentional and ongoing. Academic professionals ask questions and collect data that will inform decision making and future action by systematically utilizing data, asking reflective questions, and proceeding with change (Rallis and MacMullen, 2000).

Institutional research, as an organizational function, can be viewed as a catalyst for fostering a research culture. Historically, institutional research has served as a neutral, data-collecting body that simply created reports to satisfy external mandates (Volkwein, 1999). The traditional role of institutional research has begun to shift to one of catalyst for institutionwide change (Sanford, 1995). In support of the new institutional research role, there has been a call to have the institutional research be more than just a reporting function, and instead to use institutional research in a consultant role for decision making or as a member of a high-level administrative team, thereby bringing a universitywide research perspective to decision making (Johnston and Kristovich, 2000; MacDougall and Friedlander, 1990; Mundhenk, 2000). Such changes in institutional research are seen across the country, specifically at the community college level (Volkwein, 1999).

For example, state-mandated accountability measures are often drafted by legislatures who have little understanding of the implications for the implementation of an institution's access and equity initiatives, much less for the institutional capacity for accurate measurement of these initiatives. Consequently, as in the case of accountability funding for community colleges in California, Oregon, South Carolina, and other states, millions of dollars were given for outcome measures without specifying how the institutions

should actually go about meeting those outcomes. It is one matter to award a mathematics enrichment center funds to improve its outreach to low-achieving students; it is another matter to tie that funding to institutional transfer rates. However, do the people who run these programs have evaluation or assessment experience? What steps have they taken to track the effectiveness of their activities? And how will they incorporate the data collection process into their ongoing activities? What kind of access do they have to institutional data? These are the types of questions that the process of creating knowledge-based systems addresses.

These questions are best addressed in a research culture, where funded programs with valuable information about the effectiveness of program practices can then be used to modify those practices to increase the program success and subsequently the success of its students (Wellman, 2001). In other words, the push for accountability drives more meaningful internal change, ultimately leading the institution to apply concepts of organizational learning to its primary goal of student success (Wellman, 2001). A system of self-regulation that ensures high standards across the institution, while at the same time appearing credible to the outside world, is necessary in order to weave together external accountability needs with internal academic structures (Ewell, 1994). Similarly, self-regulation can reduce direct political control, thereby protecting academic freedom (Zumeta, 1998).

A proactive approach to fostering a research culture has been shown to provide a respite from the compliance mentality in higher education (Ewell, 1994). It has also been proposed that institutions need to shift their perspective from one that views accountability as mere bureaucratic reporting to one that foresees a connection between accountability measures and improved teaching and learning, as well as to move beyond state reporting requirements by incorporating research findings that specify areas and procedures for improvement (MacDougall and Friedlander, 1990; Ewell 1991; Wellman, 2001). Subsequently, research cultures are able to confront accountability with a new perspective. Rather than a compliance attitude, a research culture embraces reflection on its practice and strives to implement change. Organizational learning can be sustained by creating a research culture, facilitated by knowledge management and based on internal and external demands, so that ultimately the need for accountability measures and the need to increase capacity to understand and evaluate its programs is met. In this way, the accountability movement is seen as a catalyst to motivate such reflection and knowledge-driven decision making, and external involvement is motivation for institutions to become involved in and appropriately shape the accountability process.

Context and Politics of Information Flow

An examination of the structures and procedures related to the flow of information throughout the organization is perhaps the most neglected aspect in making the shift from data-driven information systems to

knowledge-based systems. The reason for this is that if knowledge is understood as information placed in a certain context and therefore embedded with meaning, the flow of information in the organization is likely to be affected by internal structures and procedures related to the creation and dissemination of this information. Context is also composed of the tacit knowledge. Many organizations ease this process of tacit knowledge transfers through the use of storytelling and community-based forums. These forums, which might consist of electronic discussions or postings on an organizational Web site, convey to staff the culture, rituals, and organizational traditions that exist as one component of the history of the organization (Davenport, 1998; Brown, 2000).

Historically, institutional research has been at the center of this information flow by providing interpretation and analysis of data to the organization. However, there are several underlying issues that affect these efforts. These include where the institutional research office is located within the organization in terms of reporting structure, whether it is centralized or decentralized, its decision-making capability, and existing channels of distribution for information. An organization that wishes to create knowledge-based systems will likely face a redesign of internal structures and procedures related to flow of information. However, as is often the case in higher education institutions, the mission of institutional research is not clear and lacks definition, institutional needs are driven by individuals' competing needs, and the end-users of the information are not asked what they need to make better decisions. The institutional researchers themselves have often been left to their own devices to set research priorities and determine who has access to the information. While the rapid sophistication of technology has placed increased demands on institutional research staff, there has also been an increase in the number and complexity of requests for data from institutional research, making the job that much more difficult. Also, there is a growing need to retrain the institutional research staff facing these new challenges (Sanford, 1995).

There are also several political barriers to information sharing. These might include local efforts that duplicate the efforts of institutional research staff due to perceived repercussions of information sharing. For example, in the case of accountability, a department may not want to reveal a breakdown of attrition rates by program within a department if there is a fear of punitive measures (such as the closing of an academic program or the reduction of funding). It may also be that information is tightly controlled within the organization and that the sharing of information is perceived as giving up power. In fact, it is often the case that the sharing of information within an organization has the potential to redistribute decision-making authority and thus impedes the creation of knowledge-based information systems unless they are supported both top-down and bottom-up within the organization (Schein, 1992). Thus, in order to understand how information

is produced and transmitted in an organization, it is necessary to study the interactions between those that make up the organization and how they create and disseminate information based on the structure and procedures that support these types of interactions (Petrides, Khanuja-Dhall, and Reguerin, 2000).

Conclusion

In this chapter I have argued that the integration of the institutional research function within the larger context of organizational learning and the creation and maintenance of a research culture facilitated by knowledge management contribute to the success of higher education institutions. The demand for accountability measures and the desire for research that informs decision making help illuminate the demands placed upon institutions to create a research culture that will enable them to meet accountability mandates and increase their capacity to understand and evaluate their academic programs and services. As illustrated above, this process involves an assessment and possible redesign of the internal structures and procedures related to the flow of information throughout an organization, specifically in light of its front-line role in the acquisition and dissemination of information within the organization. Ultimately, the push for accountability can be used to drive more meaningful internal change by increasing an organization's ability to apply concepts of organizational learning to its primary goal of student success.

Although in this chapter I have made the case for the use of organizational learning in the creation of knowledge-based systems, I have also supported the underlying assumption that organizational learning and knowledge-based systems play an important role for institutions of higher education. As Levine states: "An organization that supports information sharing and knowledge creation among its members and is committed to including and reconciling multiple viewpoints is likely to establish effective and efficient processes as well as improve organizational life" (Levine, 2001, p. 23).

Higher education institutions have a growing need for research that can inform decision making. The reconceptualization of institutional research as an integrated function of the organization would enable organizations to use comprehensive information for decision making, goal setting, and accountability and integrate organizational needs for common purposes within the institution. These common purposes include identifying information policies, designing new standardized assessment and evaluation procedures, and developing useful and user-friendly information that would allow the institution to make more informed and research-driven policies and procedures and, most important, create knowledge-based systems that support continuous learning in the improvement of programs and services for students and the community.

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